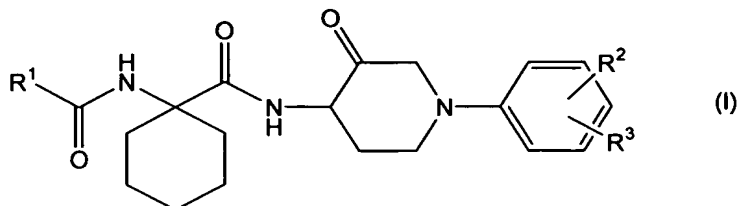


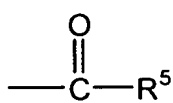
What is claimed is:

1. A compound of formula (I) or a pharmaceutically acceptable salt thereof:

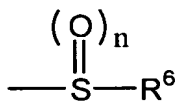


wherein:

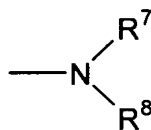
- 5 R^1 is a C_{1-6} alkyl group optionally substituted with phenyl, C_{1-6} alkoxy, or benzyloxy; a C_{2-6} alkenyl group optionally substituted with phenyl; a C_{3-6} cycloalkyl group; a C_{1-5} alkoxy group; a phenyl group substituted with halogen, phenyl, trifluoromethoxy, oxopyrrolidyl, mono- or di- C_{1-4} alkylamino or R^4 - C_{1-4} alkoxy (wherein, R^4 is morpholine, pyrrolidine or piperidine); a furanyl group optionally substituted with one or more functional groups selected from the group consisting of C_{1-6} alkyl, halogen, and oxopyrrolidyl; a benzofuranyl group optionally substituted with C_{1-6} alkyl or R^4 - C_{1-4} alkoxy (wherein, R^4 is morpholine, pyrrolidine or piperidine); a thiophenyl group substituted with C_{1-6} alkyl or halogen; a C_{1-6} alkyl-isoxazolyl group; a pyridyl group optionally substituted with halogen; a morpholinyl group; a benzothiophenyl group; a quinolinyl group; a pyrazinyl group; a benzyloxy group; an oxopyranyl group; a C_{1-6} alkyl-7H-imidazo[2,1-b]oxazolyl group; a C_{1-6} alkyl-chromon-2-yl group; or a (N-t-butoxycarbonyl)piperidinyl group, and
- 10 R^2 and R^3 are, each independently, hydrogen; hydroxy; nitro; halogen; cyano; a C_{1-6} alkyl group optionally substituted with one or more halogen atoms; C_{1-5} alkoxy; C_{1-5} alkyl-thio; furyl; 1H-tetrazol-5-yl; oxazolyl; or a group selected from the formula consisting of (II), (III) and (IV):



(II)



(III)



(IV)

wherein,

- 25 R^5 is hydrogen; hydroxy; C_{1-6} alkyl; C_{1-5} alkoxy; mono- or di- C_{1-6} alkylamino; or C_{3-6} cycloalkylamino,

R⁶ is C₁₋₆ alkyl; phenyl optionally substituted with a C₁₋₄ alkoxy group; benzyl optionally substituted with a C₁₋₄ alkoxy group,

R⁷ and R⁸ are, each independently, hydrogen; a C₁₋₆ alkylcarbonyl group optionally substituted with halogen, C₁₋₄ alkoxy, or phenyl; C₂₋₆ alkenylcarbonyl; C₁₋₄ alkoxy carbonyl; C₃₋₆ cycloalkylcarbonyl; benzoyl optionally substituted with one or more halogen atoms; mono- or di- C₁₋₄ alkylcarbonyl; or C₁₋₄ alkylsulfonyl, or bonded each ether to form a morpholine, azetidin-2-one, 3,3-dimethylazetidin-2-one, pyrrolidin-2-one, pyrrole, 2,5-dihydropyrrole, piperidin-2-one, oxazolidin-2-one, imidazolidin-2-one, imidazolidin-2,5-dione, tetrazole, 1,1-dioxoisothiazolidine, or C₁₋₆ alkyl-aziridin-2-one ring, and n is 0, 1, or 2.

2. The compound of formula (I) or its pharmaceutically acceptable salt of claim 1, wherein R¹ is a furanyl group optionally substituted with C₁₋₆ alkyl, halogen, or oxopyrrolidyl; or a benzofuranyl group optionally substituted with C₁₋₆ alkyl or R⁴-C₁₋₄ alkoxy (wherein, R⁴ is morpholine, pyrrolidine or piperidine) and R² and R³ are, each independently, hydrogen; halogen; or a group of formula (III) or (IV).

3. The compound of formula (I) or its pharmaceutically acceptable salt thereof of claim 1, which is selected from the group consisting of:

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(5-chloro-2-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-acetylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-cyanophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-cyano-3-fluorophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-cyano-6-fluorophenyl)piperidin-3-one;

5 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-cyano-5-fluorophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(3-cyano-5-fluorophenyl)piperidin-3-one;

10 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-ethanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-acetylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-formylphenyl)piperidin-3-one;

15 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-formylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-nitrophenyl)piperidin-3-one;

20 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(3-methyl-4-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(3-fluoro-2-formylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(3-chloro-2-formylphenyl)piperidin-3-one;

25 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-formyl-4-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-formyl-6-fluorophenyl)piperidin-3-one;

30 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-fluoro-3-formylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-isopropylsulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-trifluoromethylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-cyanophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(4-morpholino)phenyl]piperidin-3-one;

5 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-ethoxyphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-fluoro-4-trifluoromethylphenyl)piperidin-3-one;

10 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-chloro-4-trifluoromethylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2,4-dichlorophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-chloro-2-fluorophenyl)piperidin-3-one;

15 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methoxy-5-cyanophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-cyano-2-fluorophenyl)piperidin-3-one;

20 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(2-furyl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-bromophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methylthiophenyl)piperidin-3-one;

25 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(tert-butoxycarbonyl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-ethoxycarbonylphenyl)piperidin-3-one;

30 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methoxyphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-methylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-isopropoxyphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-ethylthiophenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(3,3-dimethylazetidin-2-one-1-yl)phenyl]piperidin-3-one;

5 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(piperidin-2-one-1-yl)phenyl]piperidin-3-one;

10 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(2-oxazolidinon-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(2-imidazolidinon-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(ethoxycarbonyl)amino]phenyl]piperidin-3-one;

15 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(methoxycarbonyl)amino]phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(4-chlorobutyryl)amino]phenyl]piperidin-3-one;

20 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(isobutyryl)amino]phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(methoxyacetyl)amino]phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(cyclopropanecarbonyl)amino]phenyl]piperidin-3-one;

25 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(3-phenylpropionyl)amino]phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(2-fluorobenzoyl)amino]phenyl]piperidin-3-one;

30 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-[N-(acetyl)amino]phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(2,5-dihydropyrrol-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(tetrazol-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(pyrrol-1-yl)-5-fluorophenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(pyrrol-1-yl)phenyl]piperidin-3-one;

5 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(N,N-dimethylcarbamoyl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(N-methylcarbamoyl)phenyl]piperidin-3-one;

10 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-carboxyphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(4-carboxyphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(1,3-oxazol-5-yl)phenyl]piperidin-3-one;

15 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-hydroxyphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(1H-tetrazol-5-yl)phenyl]piperidin-3-one;

20 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methylsulfinylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-ethylsulfinylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-isopropylsulfinylphenyl)piperidin-3-one;

25 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-N-(acryloyl)aminophenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(3,3-dimethylureido)phenyl]piperidin-3-one;

30 4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(methoxycarbonyl)phenyl]piperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-phenylpiperidin-3-one;

4-[N-[1-[N-(benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[2-(1,1-dioxo-isothiazolin-2-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(3-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

5 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-formylphenyl)piperidin-3-one;

10 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-isopropylsulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-phenylsulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-(4-methoxybenzylsulfonylphenyl)piperidin-3-one;

15 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-methoxy-2-methanesulfonylphenyl)piperidin-3-one;

20 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-thiomethoxyphenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-cyanophenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-methoxyacetylaminophenyl)piperidin-3-one;

25 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-methoxycarbonylaminophenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-cyclopropylcarbonylaminophenyl)piperidin-3-one;

30 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-isobutyrylaminophenyl)piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(4-chlorobutyryl)aminophenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(3,3-dimethylazetidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[4-fluoro-2-(3-methyl-aziridin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[4-fluoro-2-(azetidin-2-one-1-yl)phenyl]piperidin-3-one;

5 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-[4-fluoro-2-(1,3-imidazolidin-2,5-dione-1-yl)phenyl]piperidin-3-one;

10 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(1,1-dioxo-isothiazolidin-2-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(piperidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(pyrrol-1-yl)]piperidin-3-one;

15 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(oxazol-4-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(N-methylcarbamoyl)phenyl]piperidin-3-one;

20 4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[2-(N,N-dimethylcarbamoyl)phenyl]piperidin-3-one;

4-[N-[1-[N-(furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[2-(N-cyclopropylcarbamoyl)phenyl]piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-aminophenyl)piperidin-3-one;

25 4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

30 4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-ethanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(3,3-dimethyl-azetidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[4-fluoro-2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-[4-fluoro-2-(oxazolidin-2-one-3-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-[4-fluoro-2-(imidazolidin-2-one-1-yl)phenyl]piperidin-3-one;

5 4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-[2-(3,3-dimethyl-azetidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(5-methyl-isoxazol-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-[2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

10 4-[N-[1-[N-(5-chloro-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-chloro-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-(2-ethanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-chloro-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-(2-isopropanesulfonylphenyl)piperidin-3-one;

15 4-[N-[1-[N-(5-chloro-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1
-(5-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-methyl-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-
1-(2-methanesulfonylphenyl)piperidin-3-one;

20 4-[N-[1-[N-(5-methyl-thiophen-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino
]-1-(2-isopropanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-methyl-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-
1-(5-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(3-methyl-thiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-
1-(2-methanesulfonylphenyl)piperidin-3-one;

25 4-[N-[1-[N-(2-methyl-furan-3-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2
-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-methyl-furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2
-methanesulfonylphenyl)piperidin-3-one;

30 4-[N-[1-[N-(5-bromo-furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-
methanesulfonyl-4-methoxyphenyl)piperidin-3-one;

4-[N-[1-[N-(4,5-dimethyl-furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-
1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4,5-dimethyl-furan-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-
1-[2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(morpholin-4-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzothiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

5 4-[N-[1-[N-(benzothiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-tert-butoxycarbonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzothiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-chloro-5-trifluoromethylphenyl)piperidin-3-one;

10 4-[N-[1-[N-(benzothiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-chloro-2-fluoro-phenyl)piperidin-3-one;

4-[N-[1-[N-(benzothiophen-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methylphenyl)piperidin-3-one;

4-[N-[1-[N-(3-methyl-benzofuran-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

15 4-[N-[1-[N-(3-methyl-benzofuran-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(5-fluoro-2-trifluoromethylphenyl)piperidin-3-one;

4-[N-[1-[N-(3-methyl-benzofuran-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(5-cyano-2-methoxyphenyl)piperidin-3-one;

20 4-[N-[1-[N-(quinolin-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(quinolin-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-[2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(quinolin-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-nitrophenyl)piperidin-3-one;

25 4-[N-[1-[N-(pyrazin-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(pyrazin-2-ylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one dihydrochloride;

30 4-[N-[1-[N-(isonicotinylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(6-chloronicotinylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(6-chloronicotinylcarbonyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-nitrophenyl)piperidin-3-one;

4-[N-[1-[N-(pyridin-2-carbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(pyridin-2-carbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

5 4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexylcarbonyl]amino]-1-(4-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

10 4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonyl-4-methoxyphenyl)piperidin-3-one;

4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-trifluoromethylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexanecarbonyl]amino]-1-[(2-(3-phenylpropionylamino)phenyl)piperidin-3-one;

15 4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexanecarbonyl]amino]-1-[2-(cyclopropylamino)phenyl]piperidin-3-one;

4-[N-[1-[N-(4-fluorobenzoyl)amino]cyclohexanecarbonyl]amino]-1-[4-fluoro-2-(2,3,4-trifluorobenzoylamino)phenyl]piperidin-3-one;

20 4-[N-[1-[N-(4-biphenylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-trifluoromethylbenzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-(2-morpholinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

25 4-[N-[1-[N-(4-(2-pyrrolidinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-(2-piperidinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

30 4-[N-[1-[N-(4-(2-morpholinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

4-[N-[1-[N-(4-(2-pyrrolidinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

4-[N-[1-[N-(4-(2-piperidinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

4-[N-[1-[N-(5-(2-morpholinethoxy)benzofuran-2-ylcarbonyl)amino]cyclohexane carbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-(2-pyrrolidinethoxy)benzofuran-2-ylcarbonyl)amino]cyclohexane carbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

5 4-[N-[1-[N-(5-(2-piperidinethoxy)benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(5-(2-morpholinethoxy)benzofuran-2-ylcarbonyl)amino]cyclohexane carbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

10 4-[N-[1-[N-(5-(2-pyrrolidinethoxy)benzofuran-2-ylcarbonyl)amino]cyclohexane carbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

4-[N-[1-[N-(5-(2-piperidinethoxy)benzofuran-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

4-[N-[1-[N-(4-(2-oxopyrrolidine)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

15 4-[N-[1-[N-(4-(2-oxopyrrolidine)furan-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-(2-morpholinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-methanesulfonylaminophenyl)piperidin-3-one;

20 4-[N-[1-[N-(4-(2-morpholinethoxy)benzoyl)amino]cyclohexanecarbonyl]amino]-1-[4-fluoro-2-(pyrrolidin-2-one-1-yl)phenyl]piperidin-3-one;

4-[N-[1-[N-(4-(dimethylamino)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(4-(diethylamino)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-methanesulfonylphenyl)piperidin-3-one;

25 4-[N-[1-[N-(4-(dimethylamino)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

4-[N-[1-[N-(4-(diethylamino)benzoyl)amino]cyclohexanecarbonyl]amino]-1-(4-fluoro-2-methanesulfonylphenyl)piperidin-3-one hydrochloride;

30 4-[N-[1-[N-(3-phenylpropionyl)amino]cyclohexylcarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(2-methylcinnamoyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(benzyloxycarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-acetylamino)piperidin-3-one;

4-[N-[1-[N-(benzyloxycarbonyl)amino]cyclohexylcarbonyl]amino]-1-(2-trifluoromethylphenyl)piperidin-3-one;

4-[N-[1-[N-(pyran-2-one-5-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

5 4-[N-[1-[N-((6-methyl)-7H-imidazo[2,1-b]oxazol-5-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-((6-methyl)-chromon-2-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

10 4-[N-[1-[N-(isobutyryl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(isovaleryl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(3,3-dimethylacryloyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

15 4-[N-[1-[N-(2-methoxyacetyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(cyclopropanecarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

20 4-[N-[1-[N-(cyclobutanecarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-(cyclopentanecarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

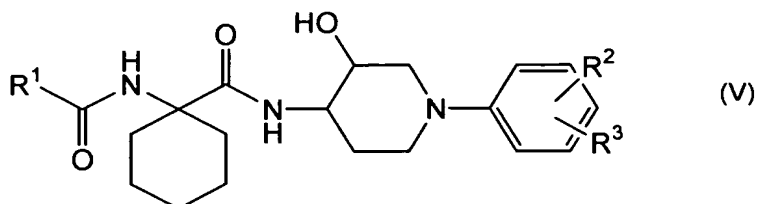
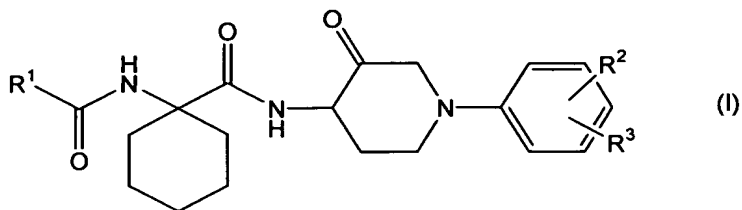
4-[N-[1-[N-(cyclohexanecarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

25 4-[N-[1-[N-((3-isobutyloxy)propionyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one;

4-[N-[1-[N-((3-benzyloxy)propionyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one; and

30 4-[N-[1-[N-((N-t-butoxycarbonyl)piperidin-4-ylcarbonyl)amino]cyclohexanecarbonyl]amino]-1-(2-methanesulfonylphenyl)piperidin-3-one.

4. A process for preparing a compound of formula (I) or a pharmaceutically acceptable salt thereof, which comprises oxidizing a compound of formula (V) with an oxidizing agent:

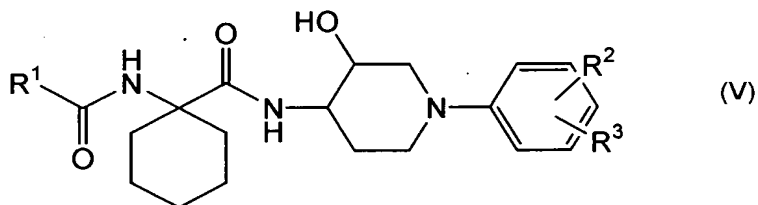


wherein, R^1 , R^2 , and R^3 are the same as defined in claim 1.

5

5. The process of claim 4, wherein the oxidizing agent is a pyridine- SO_3 complex, oxaryl chloride-dimethylsulfoxide, or pyridinium chlorochromate.

6. A compound of formula (V) or a pharmaceutically acceptable salt thereof:

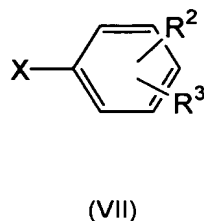
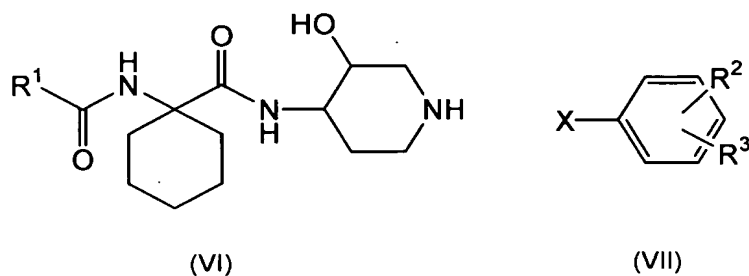
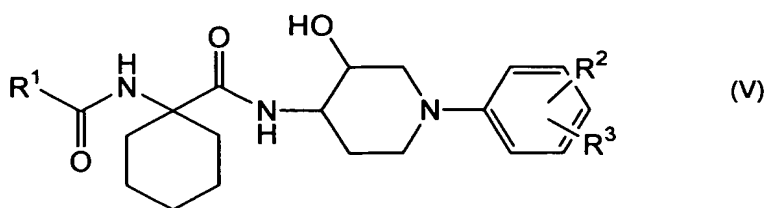


10

wherein, R^1 , R^2 , and R^3 are the same as defined in claim 1..

7. A process for preparing a compound of formula (V) or a pharmaceutically acceptable salt thereof, which comprises reacting a compound of formula (VI) with a compound of formula (VII):

15



wherein, R^1 , R^2 , and R^3 are the same as defined in claim 1; and X is halogen, nitro, C_{1-7} alkylsulfonyl, or trifluorosulfonate.

5

8. The process of claim 7, wherein the reaction is carried out in the presence of a base and a palladium catalyst.

10

9. The process of claim 8, wherein the palladium catalyst is palladium diacetate ($Pd(OAc)_2$) or tris(dibenzylideneacetone)dipalladium ($Pd_2(dba)_2$).

15

10. A pharmaceutical compositions for inhibiting cysteine proteases comprising a therapeutically effective amount of the 1-phenylpiperidin-3-one derivative or a pharmaceutically acceptable salt thereof of claim 1 and a pharmaceutically acceptable carrier.